THE · EXTENSION PATHOLOGIST

A NEWS LETTER FOR EXTENSION WORKERS INTERESTED IN PLANT DISEASE CONTROL

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LIST OF

EXTENSION PLANT PATHOLOGISTS

AS OF NOVEMBER 1, 1937

California	- C. E. Scott, University of California, Berkeley.
Colorado	- W. J. Henderson, Colorado State College of Agriculture, Fort Collins.
Delaware	- T. F. Manns*, University of Delaware, Newark.
Georgia	- _____, State College of Agriculture, Athens.
Indiana	- C. T. Gregory, Purdue University, La Fayette.
Iowa	- R. H. Porter, E. P. Sylvester, J. H. Standen, Iowa State College of Agriculture, Ames.
Kansas	- J. O. Miller, Kansas State Agricultural College, Manhattan.
Maryland	- R. A. Jehle*, E. A. Walker*, University of Maryland, College Park.
Massachusetts	- O. C. Boyd, Massachusetts State Agricultural College, Amherst.
Michigan	- J. H. Muncie*, Michigan State College, East Lansing.
Minnesota	- R. C. Rose, University of Minnesota, University Farm, St. Paul.
New York	- M. F. Barrus, Charles Chupp, K. H. Fernow*, W. D. Mills, New York State College of Agriculture, Ithaca.
North Carolina	- Luther Shaw, College of Agriculture, Raleigh.
North Dakota	- F. Gray Butcher**, North Dakota Agricultural College, Fargo.
Ohio	- A. L. Pierstorff, Ohio State University, Columbus.
Pennsylvania	- A. H. Bauer, O. D. Burke, R. S. Kirby, H. W. Rankin, G. L. Zundel, Pennsylvania State College, State College.
South Carolina	- W. C. Nettles**, Clemson College, Clemson.
Virginia	- James Godkin, Virginia Polytechnic Institute, Blacksburg.
West Virginia	- C. R. Orton*, E. C. Sherwood*, College of Agriculture, Morgantown.
Wisconsin	- J. W. Brann*, R. E. Vaughan, College of Agriculture, Madison.

* Part time.

** Extension entomologist and pathologist.

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DO'S AND DON'TS IN DEMONSTRATING

1. Have singleness of aim in the demonstration.
2. The subject selected should be within the experience of the demonstrator.
3. Strive to give a real demonstration rather than just a lecture.
4. It is objectionable to memorize the demonstration word for word.
5. Demonstrations should not be given in too hurried a manner.
6. A too-constant flow of speech is tiring to the audience. A pause occasionally can be effective. It may give the audience time to consider the value of the point.
7. Demonstrators should talk directly to the audience rather than to the table or out the window.
8. Talk in a conversational tone. Just be natural.
9. Avoid unnecessary repetition in presenting subject matter.
10. Let the audience SEE plainly EVERY STEP of the demonstration.
11. Keep the working space clear--do not work behind equipment.
12. If a team demonstration, each member should call the other by the first name rather than "teammate" or "partner."
13. The talking should be shifted from one demonstrator to the other in a very informal manner.
14. An affected or disinterested manner on the part of a demonstrator is objectionable.
15. It is very ineffective merely to read a recipe or formula--have a chart.
16. Display charts only when they are ready to be used.
17. Charts, if used, should be printed, not written.
18. In answering questions, infer the question in the answer occasionally rather than ALWAYS repeating the question word for word.

--Edna Troth and W. R. Amick,
Let's Demonstrate - 4-H Club Demonstrations.
Indiana Ext. Bull. 216. February 1937.

BASIC COPPER SULPHATE AS A SEED TREATMENT FOR CONTROLLING SEED-BORNE SMUT IN WINTER WHEAT IN OREGON

By Roderick Sprague
Plant Pathologist
U. S. Bureau of Plant Industry
Cooperating with
Oregon Agricultural Experiment Station

Basic copper sulphate is a relatively insoluble blue-green dust having 50-52 percent metallic copper. It is sold in Oregon under the trade names Sherwin-Williams Basul (for wheat) and Basi-Cop (for horticultural plants), Acme Kopper King, and Mountain basic copper sulphate. Most of these products usually retail at about 1 cent a pound less than the 52 percent copper carbonate. Basi-Cop has sold for several cents per pound less than the copper carbonates. Some of these products have superior coverage properties and do not fog as much as some of the chalky copper carbonates.

In trials conducted in Oregon and Washington during the past three seasons, Basi-Cop was definitely more effective than any of the copper carbonates during the first 2 years, and both it and Basul were slightly less effective than the carbonates during the last season. Seeding conditions for the first 2 years were featured by cold, wet soil during and just after seeding. The third season, just past, was characterized by a long, dry fall, and seeding was done in "the dust." It is evident after examining the data from thousands of rows tested that Basic copper sulphate is more effective than copper carbonate only when the soil has abundant moisture for germination and the soil temperature has dropped to a point that permits maximum smut development. When seeded under average favorable conditions there is not much to choose between basic copper sulphate and 52 percent copper carbonate. When seeding is done in the dust, copper carbonate, as mentioned, may be less erratic than the basic copper sulphate.

Our experience, and that of growers, indicates that 2 ounces per bushel of copper dust is insufficient for controlling many cases of seed-borne smut in fall-sown wheat in some of the better wheat areas in Oregon and Washington. Three ounces per bushel is more satisfactory for either 52 percent copper carbonate or basic copper sulphate.

Besides basic copper sulphate, a small amount of ground copper sulphate (bluestone) is sometimes used for dusting seed wheat. While it is considerably cheaper than basic copper sulphate, it is less effective, reduces stand, and is more disagreeable to handle. The monohydrated copper sulphate is very effective in controlling smut, but is extremely irritating to the user as well as being depressing to germination. One package Bordeaux dust (22 percent copper) has been tried out in a few localities for treating wheat for smut. When used at the 4-ounce rate in areas where early September seeding is practiced it gives fair control but it is not recommended, for there are better treatments. Copper Hydro-40, said to be copper

hydroxide or possibly an alkaline copper sulphate with gypsum added, has a copper content of 26 percent. At the 2-ounce rate it gives only mediocre control but at the 4-ounce-per-bushel rate has given good control without apparent injury. Since it sells at about the price of ground bluestone, or only a cent or two higher, it may have a market if it does not develop faults that have not at present appeared. It also is a blue dust with the general appearance of the dry Bordeaux dust.

In our Oregon recommendations (Oreg. Agr. Expt. Sta. Circ. Inf. 173, Aug. 1937) we list New Improved Ceresan 1/2-1 oz.; basic copper sulphate 3-4 oz.; and 52 percent copper carbonate 3-4 oz., as desirable treatments.

--(Corvallis, Oreg., October 22, 1937.)

WHEAT-SEED CONDITIONING BY PORTABLES ON THE INCREASE

1937 Report of Wheat Cleaned and Treated by Ten Portable Units Operated Under Direction of the Southwestern Indiana Wheat Improvement Program

Below is given the number of bushels of wheat cleaned and treated by counties in Indiana and Illinois in 1937. The number of bushels cleaned exceeds that of the previous year by 15,270 bushels, and the number of bushels treated was more than double - 52,404 as compared with 24,436 last year. Comparable figures showing the work of these machines in 1935 and 1936 were given in The Extension Pathologist, serial numbers 20 and 26, respectively. --R.J.H.

Wheat cleaned and treated by portable units in Indiana and Illinois, 1937

State and county	Wheat cleaned	Wheat treated
Indiana:	Bushels	Bushels
Knox	46,077	6,512
Posey	30,328	11,635
Gibson	21,823	4,037
Vanderburgh	10,034	1,415
Daviess	14,643	742
Sullivan	16,496	1,094
Warrick	9,072	4,377
Spencer	1,066	130
Total	149,539	29,942
Illinois:		
Wabash	9,040	4,250
Edwards	6,500	3,447
Wayne	1,659	1,679
White	19,911	5,541
Gallatin	7,155	1,730
Lawrence	15,111	4,072
Washington	749	749
Richland	1,306	994
Total	61,431	22,462
Grand total	210,970	52,404

--C. E. Skiver, Agronomist,
Extension Division, Purdue University; University of Illinois and Research Division of Igleheart Bros., Cooperating.

DEMONSTRATION PLOTS WITH WATERMELONS

The wilt-resistant watermelon varieties, Pride of Muscatine, Iowa King, and Iowa Belle, released in 1931 by the Iowa Agricultural Experiment Station, have until 1936 been the only available varieties for growing on disease-infested soil. It was realized when these varieties were introduced that they lacked the high quality of certain commercial nonresistant varieties but should be used for infested soils until more improved resistant varieties could be developed.

Four new wilt-resistant varieties were introduced in 1936, two varieties by the Iowa Agricultural Experiment Station, one by the Florida Agricultural Experiment Station, and one by the Hawkesbury Agricultural College, New South Wales.

One of these new varieties released by the Iowa Agricultural Experiment Station is a Kleckley Sweet type known as Improved Kleckley Sweet No. 6 and the other a Stone Mountain type known as Improved Stone Mountain No. 5. The earlier introductions may be considered to have served a useful purpose of filling the demand for a resistant variety until improved strains could be developed. Because of the superior quality, these two new wilt-resistant varieties should immediately replace Pride of Muscatine and the other earlier resistant varieties.

The introduction from the Florida Agricultural Experiment Station is also a selection from Kleckley Sweet known as the variety Leesburg. The other variety from Australia is a Thurmond Grey type and will be known as Wilt Resistant Thurmond Grey.

Demonstration test plots were established in Lee, Mahaska, Muscatine, and Polk counties for the purpose of determining the adaptability of these new wilt-resistant varieties to Iowa conditions and to enable people throughout the State to become familiar with them. Because of the scarcity of seed, only Improved Kleckley Sweet and Wilt Resistant Thurmond Grey were grown in Polk County. All the four new resistant varieties were tested out in the other counties and compared with the commercial variety Dixie Queen. Also in those three counties a considerable number of experimental wilt-resistant strains were tested to furnish information for the research breeding program.

In all the tests, Improved Kleckley Sweet No. 6 and Wilt Resistant Thurmond Grey proved to be satisfactory wilt-resistant varieties. Leesburg contained sufficient wilt resistance but appeared to have slightly paler flesh color than Improved Kleckley Sweet No. 6. Until further tests are made, Improved Kleckley Sweet No. 6 will be recommended over Leesburg. Wilt Resistant Thurmond Grey has a gray rind color, thereby preventing sun burning. This is one advantage not possessed by the other wilt-resistant varieties. Improved Stone Mountain No. 5 is the earliest of any of these four varieties, but has very tender (watery) flesh. The tender flesh will likely prevent this variety from becoming popular as a shipping melon, but its earliness warrants its use.

In addition to the tests in Iowa, 43 workers in the various colleges, and commercial growers representing 19 States and 5 countries abroad were sent seed of Improved Kleckley Sweet No. 6 and Improved Stone Mountain No. 5. In most cases reports have been returned registering satisfactory results with these varieties. In all cases, Improved Kleckley Sweet No. 6 was considered superior to Improved Stone Mountain No. 5.

Seed of both of these wilt-resistant varieties was released to Iowa growers for commercial production and to the J. C. Robinson Seed Company of Waterloo, Nebr., for seed production.

Approximately 250 acres of these varieties were grown for commercial production in Iowa. Most of this acreage was in the vicinity of Conesville and Fruitland.

The J. C. Robinson Seed Company has grown approximately 6 tons of seed of these two varieties, which is being sold to retail seed companies for the 1937 crop.

--R. H. Porter, Extension Plant Pathologist.
(Annual Report of Extension Work on Plant Diseases in Iowa, 1936.)

A TRIAL OF MOSAIC-RESISTANT SHAMROCK CUCUMBERS

W. J. Henderson, extension plant pathologist for Colorado, conducted a demonstration with the Shamrock cucumber developed at the Iowa Agricultural Experiment Station. This new variety was tried out along with a standard pickling variety at Evans, Colo., in 1936. The irrigated plot was in a district where cucumber mosaic had been prevalent in previous seasons. Ten pairs of rows of each variety were alternated across the plot. Of 140 shamrock plants, only 2 showed mosaic at the end of the season. Of 135 standard variety plants, 15 were infected before maturity. Although there were only a relatively few plants infected in either variety, the Shamrock had by far the least. It was not entirely immune but showed resistance.

Mr. Henderson said further that the Shamrock was outstandingly resistant to drought and with more vigorous vine growth and better yield than the standard variety. However, it is too slender and long for a desirable pickling type. It can be recommended as a slicer cucumber. He further states that it would be desirable to have another variety of the pickling type that is resistant to mosaic for use in Colorado.

POTATO SPRAYING WORK IN MICHIGAN

Our most extensive cooperative project was carried on with the extension specialist in entomology on disease and insect control of potatoes. Duplicated demonstration plots were planted at the Lake City Potato Experimental Farm and a farm near Lapeer, Mich. Care of the plots and application

of spray and dust materials were carried out through cooperation of the potato office of the farm crops department by the farmer demonstrator and Lapeer County Agent, R. C. Lott. The first applications were made by the specialist and all subsequent ones by the cooperators. On these plots Bordeaux-calcium arsenate spray, monohydrous copper sulphate-lime-arsenate dust and calcium arsenate-lime dust alone were applied four times with knapsack sprayer, hand-crank duster, and burlap bag, respectively. The plots at the Lake City Farm were so badly damaged by drought as to be worthless and were abandoned. Those on the farm near Lapeer were dug for demonstration at the potato-day meeting. The results were as follows:

Yield (Bushels per acre)

Treatment	Plot 1	Plot 2	Average
Bordeaux-calcium arsenate spray	189.7	195.5	192.1
Copper-lime-arsenate dust	190.5	180.5	185.5
Calcium arsenate-lime dust	155.5	130.7	143.1

This demonstration showed conclusively that hopperburn and early-blight control through applications of Bordeaux mixture or copper-lime dust resulted in increased yields of 42 or 49 bushels an acre, depending upon the material used, when Colorado potato beetles were not a factor.

Special effort has been made to induce growers to protect their crops by means of spraying and dusting. This point has been specially stressed in all potato and vegetable disease meetings and district meetings of dealers in fungicides and insecticides. Data were collected from manufacturers of spraying and dusting equipment, fungicide and insecticide dealers, and county agricultural agents, showing the number of spraying and dusting machines and percentage of growers who applied protective material to the potato crop. As a direct result of this potato program, approximately 2,000 additional hand-crank dusters were purchased by growers, adding some 6,000 acres to the acreage of potatoes protected. At a conservative estimate of $20 an acre net increased return, the savings to the growers amounted to $120,000 during 1936, and in addition a higher quality of product was harvested.

--J. H. Muncie, Extension Plant Pathologist.
(Annual Report of Extension Work, Michigan, 1936.)

RESULTS OF POTATO-SEED TREATMENT

A summary of results from eight potato-seed treatment demonstrations in three Kansas counties in 1936 showed the following. Commercial Irish Cobbler seed was planted, and the treatment used was the acid corrosive sublimate.

Yield U. S. No. 1.

Seed treated	159 bu.
Seed not treated	144 bu.
Gain from treatment	15 bu.

Yellows-Resistant Celery

A demonstration comparing the new Michigan strain of yellows-resistant celery with a nonresistant strain, was arranged on a farm in Ramsey County, Minn. The plots were located on a field that was heavily infested with yellows in past years. The resistant strain of celery produced a full crop with no evidence of loss from yellows. The nonresistant strain suffered a loss of 75 percent of the crop due to yellows.

--R. C. Rose, Extension Plant Pathologist.
Annual Report of Extension Work on Plant Diseases, Minnesota, 1936.)

Yellows-Resistant Cabbage

A survey of sales of cabbage seed by the leading seed companies of St. Paul and Minneapolis gives a fair indication of the amount of yellows-resistant seed now being used in the Twin City area. This demand for yellows-resistant seed started about 3 years ago when a number of cabbage demonstrations were conducted in three vegetable-growing counties.

Sale of Yellows-Resistant Cabbage Seed in Minnesota, 1936

Dealer	Yellows-Resistant Strains	All Strains
	Pounds	Pounds
A	10	100
B	75	100
C	150	450
D	20	90
E	50	200
F	10	100
Total	315	1,040

--R. C. Rose, Extension Plant Pathologist.
Annual Report of Extension Work, Minnesota, 1936.)

COTTONSEED TREATMENT DEMONSTRATIONS IN GEORGIA GIVE REMARKABLE RESULTS THIS YEAR

A table showing the results of 25 cottonseed treatment demonstrations in 13 Georgia counties this year has recently been received from H. W. Rankin, formerly Georgia extension plant pathologist. Counts made of young plants before chopping showed an average increase in stand from treatment of 46 percent in the 25 demonstrations.

At picking time further data were obtained from 10 of the demonstrations. These showed an average increase in number of bolls per 100 feet of row ranging from 68 to 730. Based on boll numbers the average increase in yield of treated over nontreated rows was estimated at 47.7 percent.

BASIC COPPER SULPHATE AS A SPRAY FOR CANTALOUPS

Two spraying demonstrations were conducted on cantaloups in Wicomico County, Md., for the control of diseases. Materials used were Bordeaux mixture 4-6-50 and basic copper sulphate 2-50. Results of these tests were reported by County Agent J. P. Brown, as follows:

"Edgar Williams sprayed part of his field with basic copper sulphate and left several rows unsprayed. Although no actual yield records were kept, the sprayed portion of his field remained green until plowed under. The unsprayed portion died with disease at least a week or ten days before the sprayed portion. Mr. M. G. Culver, Jr., near Salisbury, has used basic copper sulphate on cantaloups and has found it so successful that he has discarded Bordeaux as spray material entirely. He believes that if this material is applied in time, there will not be any loss from disease in cantaloups."

--R. A. Jehle, Extension Plant Pathologist.
(Annual Report of Extension Work in Plant Diseases, Maryland, 1936.)

ONION GROWERS PROFIT BY SEED AND SOIL TREATMENT

Because of the epiphytotic of mildew in 1935, onion growers made special effort to treat seed with formaldehyde in 1936. Approximately 5,000 gallons of material were purchased to apply in diluted form to 3,500 acres of onions at seeding time. This seed and soil treatment not only reduces mildew carried on the seed but is a preventive of onion smut and damping off of the seedlings. Seed so treated at planting time showed an increase of 35 percent in germination and stand. Taking the results on a Calhoun County farm as typical, onion growers realized an increase of approximately 200

crates per acre by treating, or a total increase of 700,000 crates for the State. The estimated value of 25 cents a crate to the grower shows an increase of $175,000 for the crop due to formaldehyde treatment.

--J. H. Muncie, Extension Plant Pathologist.
(Annual Report, Extension Work, Michigan, 1936.)

TOMATO LEAFMOLD SUCCESSFULLY CONTROLLED

The control of tomato leafmold has been successfully accomplished in greenhouses in Indianapolis, Evansville, Richmond, and Logansport, Ind. The spread of influence of our demonstrations is clearly shown in the Indianapolis greenhouses. Three years ago leafmold was one of the most destructive diseases of tomatoes in that area. One important grower gave up tomato growing for 1 year because of this disease. We demonstrated the possibility of controlling this disease in two houses by heat and ventilation continued until the middle or last of June. As a result, the disease practically disappeared from these houses. This year the practice of holding heat in the houses late in the season, and ventilating, is generally practiced in places where we have never visited. At Logansport, one firm has produced the finest crop of tomatoes they have ever grown. In the past, leafmold has reduced their crop by 25 or 50 percent. These growers never seemed to grasp the necessity for heat and ventilation until they visited the demonstrations at Indianapolis.

--C. T. Gregory, Extension Plant Pathologist,
Purdue University, La Fayette, Ind.

RUST RESISTANCE IN POLE BEANS

The Kentucky Wonder bean test was repeated again this year, on the same site as in the preceding 2 years. The staff of the vegetable gardening department, Massachusetts State College, cooperated as in former years.

In addition to the hybrids furnished by Dr. Wingard of Virginia, U. S. No. 3 and 4, resistant selections, were used as well as two varieties from the Associated Seed Growers.

After the inoculations with rust-spore suspension on July 23 and 31, the disease developed rather rapidly in the more susceptible lots. The ordinary strains of Kentucky Wonder were most heavily affected. However, all the Virginia hybrids and U. S. Nos. 3 and 4 also were moderately to heavily affected. Apparently this year form 11 of the rust organism predominated over form 1, for it is known that U. S. Nos. 3 and 4 are resistant only to form 1. Hence the hybrids show the same behavior toward those two forms of rust as the U. S. Nos. 3 and 4.

One variety of Kentucky Wonder from the Associated Seed Growers, on the other hand, was practically immune to the form of rust that was present, that is, their Rust Resistant Kentucky Wonder. Their "Asgrow" strain of the same variety was susceptible.

As in the 2 preceding years, the hybrids from Virginia were again quite late in blooming, setting, and maturing their pods. At the same time, they were profuse in the amount of vegetative growth. The other special selections behaved very much like the ordinary Kentucky Wonder in vegetative growth and fruiting. Such a variety as the resistant one from the Associated Seed Growers certainly should be well adapted to this section. At least, it is highly resistant to one form of the rust disease.

--O. C. Boyd, Extension Plant Pathologist.
(Annual Report of Extension Work, Massachusetts, 1936.)

INDIANA FLORISTS INSTALL SPRAYING EQUIPMENT

Thirty-six florists have established high-pressure spraying equipment in their houses. This number may seem small, but when we consider that 5 years ago even the best houses did not have adequate spraying equipment, this number becomes quite significant of the constant pressure that has been brought to bear on the growers, urging that they establish this better spraying apparatus.

--C. T. Gregory, Extension Plant Pathologist.
(Annual Report of Extension Work, Indiana, 1936.)

The wisest thing we suppose
That a man can do for his land,
Is the work that lies under his nose,
With the tools that lie under his hand.
--Rudyard Kipling.